



# HAMMER

## Emergency Response Training for the Hydrogen Economy

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May 26, 2005

Project  
ID #SA5

# Overview

## Timeline

- Project start date: 06/04
- Project end date: ongoing
- Percent complete: 5%

## Budget

- Total project funding: \$4.7 million (through FY07)
- FY04 Funding: \$20K
- FY05 Funding: \$250K

## Barriers

- Lack of Hydrogen Knowledge by Authorities Having Jurisdiction.
- Lack of Hydrogen Training Facilities for Emergency Responders.

## Partners

- US DOT
- NASFM
- CaFCP
- ICC
- NHA

# Overview

- Partner Contributions:
  - DOT: Possible co-funder of vehicle-specific information and training materials
  - NASFM: Collaborate in securing training audiences, publicizing HAMMER, fire service feedback on course content and prop design
  - CaFCP: Provide portions of course curriculum, Emergency Response Guides, possibly a vehicle prop
  - ICC: provide accreditation for course curriculum, audiences for training
  - NHA: Publicize training program, provide venues for conduct of offsite courses

# Objectives

- MYPP Objective: Promote widespread sharing of safety-related information, procedures and lessons learned to first responders, jurisdictional authorities and other stakeholders.
- Project Objectives: Prepare essential safety personnel for the hydrogen transition:
  - First Responders for responding to hydrogen incidents
  - Code Officials for inspecting and approving proper hydrogen system installation
  - Design of curricula, props, etc. underway

# Approach

- Using OSHA/NFPA-developed 4-tier HazMat training method
- In FY05, develop first-tier “Awareness Level” curriculum
- Soliciting input on curriculum content and hydrogen behavior demos and life-sized training props



HAMMER: ER Training for the Hydrogen Economy



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# Challenges

- Funding availability
- High numbers of first responders and others needing to be trained (1 million +?)
- Nearly 70% of fire fighter forces in U.S. are staffed by volunteers
- Lead time for designing/constructing props is 12-18 months

# Technical Accomplishments/ Progress/Results

- Awareness Level Course Ahead of Schedule
  - Reviewed existing hydrogen safety training courses for material
  - Developing initial training curriculum.
  - Pilot course for fire service personnel scheduled for August 30-31.
  - Coordinating with ICC to provide 15-20 fire service personnel for pilot course.
- Drafted 5-Year Plan for site development
- Achieved significant buy-in to overall effort

# Future Work

## FY06

- Modify 1<sup>st</sup> tier (Awareness Level) course curriculum per comments received
- Design and develop “hydrogen behavior demonstration” props
- Initiate development of 2<sup>nd</sup> tier (Operations Level) curriculum incorporating behavior demonstrations
- Modify Awareness Level curriculum as needed for Code Official audience
- Obtain ICC accreditation of Awareness Level course
- Coordinate with external organizations to schedule attendees/classes
- Select first burn prop/training scenarios to be constructed and initiate design process



# Future Work

FY07

- Continue to conduct Awareness-Level training courses
- Finalize Operations-Level curriculum and conduct pilot course
- Obtain ICC accreditation of Operations-Level course
- Begin development of distance-learning modules
- Complete final design and construction of first life-size burn prop

# Publications and Presentations

- Kinzey, B.R., Fassbender, L.L. and Akers, B.M. National Training Facility for Hydrogen Safety: Five-Year Plan for HAMMER, Submitted to 2005 HYSAFE Conference, Pisa, Italy, September 2005.
- National Hydrogen Association. “HAMMER Facility Well Positioned for Hydrogen Safety Training of First Responders.” Hydrogen Safety Report , April 2005.
- Fassbender, Linda and Bret Akers. National Training Facility for Hydrogen Safety at the HAMMER Site. Presented to Hydrogen and Fuel Cells Summit VIII, Miami, FL June 15, 2004.
- Concept also presented to a number of audiences to get buy-in and solicit collaboration (unpublished presentations).

# Contacts

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# Hydrogen Safety

The most significant hydrogen hazard associated with this project is:

*The potential for an abnormal event during routine operation or maintenance of the prop.*

# Hydrogen Safety

Our approach to deal with this hazard is:

*All live-fire props go through a rigorous design and approval process prior to their construction, and are constructed by professional organizations in this line of business (e.g., Kidde Fire Systems). Existing props are inspected and retested for correct operation on a quarterly basis by the manufacturer. All affected on-site personnel are required to complete in-depth training on the design, operation, maintenance, fueling, and safety systems for the prop(s).*